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(54) Production of artwork

(57) A method of providing an image on artwork comprises the steps of forming a toner image on a first receptor by a xerographic process, eg using a photocopier or laser printer, transferring the toner image under the action of heat and pressure to an intermediate carrier sheet, and then transferring the toner image, again under heat and pressure, to the artwork. The first receptor is preferably a silicone-coated sheet of paper or plastics film; the intermediate is preferably a dimensionally-stable smooth plastics sheet, such as polyethylene terephthalate; this intermediate may be transparent or translucent to enable the artist to position the image where desired over the artwork. After the double transfer, the toner image on the artwork may receive additional colouring or a metallic finish from a suitable blocking foil.

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PRODUCTION OF ARTWORK

This invention relates to the production of artwork.

It is often desired to assemble two images together to form a composite image. One example of this is the application of wording to a background, e.g. to create an advertisement including a legend.

The classical approach is to apply the wording by hand, either by hand drawing the letters or, e.g. using preformed letters on a dry transfer sheet. Both methods suffer from the disadvantage that the entire word is not visible at once, and considerable skill is required to know where to start in order that, with appropriate spacing, the word finishes in a desirable place and the overall effect is aesthetically satisfactory.

An alternative approach which has been widely adopted is to provide the image such as words on a thin transparent carrier film and to adhere it in a desired position. The major disadvantage of this approach is that the film is, to the naked eye, visible, though its presence may "disappear" when the complete artwork is, e.g. photographed using a process camera for the production of colour separations to print the final advertisement in multiple copies by four colour process printing.

Various methods are known for the production of such materials, such as by lett rpr ss or other printing on to a thin sheet of plastics material or, more recently, by xerographically imaging a laminate consisting of a backing sheet and releasably adhered thereto a thin mat surfaced plastics film, the surface of which is adapted to receive xerographic toner material, the assembly being designed to be fed in the same way as a sheet of copy paper is fed through a xerographic copying machine. The imaged sheet is used by excising the portion imaged with the desired legend or the like and adhering it to the background in the desired position. This approach suffers from the same disadvantage that the surrounding plastics film is visible which is unsatisfactory when viewed by the human eye.

It has been suggested that instead of imaging a plastics film which was then itself stuck to the artwork, imaging should be carried out using special toner which could be transferred to the artwork. A disadvantage of this is the fact that the image normally comes out mirror reversed, and although this can be overcome by repeating the operation twice (two mirror inversions restoring the original) there is a loss of definition in doing so. The need to use a special toner is also very inconvenient, as the copying machine must be modified to enable use of the system, and modified back for normal use.

We have now found that by careful selection of materials and processing conditions, it is possible to make a copy of a desired image by a xerographic process and to transfer that xerographic copy the right way round on to desired artwork.

According to a first feature of the present invention, there is provided a method of forming artwork having a right reading image thereon which comprises

i) generating upon a first receptor, by a xerographic process, the right reading image in xerographic toner material;

ii) transferring under the application of heat and pressure, the xerographic toner image from the first receptor to an intermediate substrate and removing the first receptor and

iii) assembling together the intermediate substrate and the desired final receptor and, under the action of heat and pressure, transferring the toner image from the intermediate substrate to the final receptor and, thereafter, removing the intermediate substrate to leave the right reading image on the desired final receptor.

We have found that by appropriate and careful selection of materials, and appropriate and careful selection of processing conditions, the two transfer processes may be achieved cleanly, exactly and without material difficulty under the action of heat and pressure.

The present invention thus enables an image to be transferred from any source which can be laid on the platen of a xerographic copying machine, to artwork which is not itself appropriate for using as an image receptor in a xerographic copier, e.g. because it is heat sensitive or on an inflexible substrate such as card or artboard.

After the double transfer of the xerographically deposited image, it may, if desired, be coloured or given a metallic surface effect using the process described in EP-A-0191592. That process is commercially available under the trade mark OMNICROM.

Clearly, th selection of imag able mat rial for th first receptor and of the intermediate substrate will depend on the particular nature of the material used to form the xerographic image. Preferably, the materials chosen should be adapted to work with most, if not all, of the commercially operative toner systems, irrespective of whether they are used in xerographic apparatus adapted for copying or xerographic apparatus adapted for image production from electronic signals, most particularly so-called laser printers. Currently, the great majority of such toner materials are based on a combination of a fusible thermoplastic resin and a suitable pigment and it is not impossible to provide materials which will work with most such systems.

We have found that the imageable material may be a silicone coated sheet and the intermediate substrate a polyethylene terephthalate sheet, but other workable systems may be found by experiment.

The intermediate substrate is preferably a smooth surfaced transparent plastics foil of high dimensional stability. Commercially available foils are found to work, in many cases, without any surface treatment or modification other than any which may have been applied during its manufacture.

The imageable material which has the xerographic image placed thereon will generally be a sheet of paper or plastics film having an appropriate surface coating, e.g. a silicone surfacing as noted above. The material should be of such physical characteristics that it may be handled by the normal paper transport system in a xerographic copier or xerographic printer unit.

As noted above, in order to transfer the formed

xerographic image from the original receptor to the intermediate sheet and subsequently from the intermediate sheet to the desired artwork, heat and pressure need to be applied. This is conveniently done at least for the first such transfer step by placing the original receptor and the intermediate sheet facing one another with the image between them and passing the assembly of such sheets through the nip between a pair of heated rollers. The passage speed and temperature may be chosen within a wide range but, as indicated above, are preferably chosen such that transfer occurs for a wide range of toner images produced by standard unmodified copying or printing apparatus using the standard toner material. In some cases, transfer from the intermediate substrate to the final receptor artwork may take place in similar fashion, but it is sometimes not possible to do this because of the nature of the artwork itself, e.g. because the artwork is sensitive or physically inappropriate, for example by being on thick artboard. In such a case, the second transfer step under heat and pressure may be carried out using a heated platen press or using a hand-held heated iron or roller, the press, iron or roller preferably being equipped with temperature control to enable a desired transfer temperature to be achieved. Again, simple experiment will find appropriate application pressures and times which will work with most commercially available toners. The first transfer step may also be carried out using such methods.

The following Example will serve to illustrate the invention:

Example

The imageable sheets used in this Example are polyethylene terephthalate sheets coated first with a keycoat and,

subsequ ntly, with a silicone-based coating composition. The intermediate substrat used was sh et polyethylene terephthalate.

A solution of polyvinylidene dichloride resin (Saran F310 ex Du Pont) was made by dissolving 5 parts by weight of the resin in powder form into 95 parts by weight of methyl ethyl ketone. This solution was then coated on to 75 micron thick polyethylene terephthalate sheets using a Meyer bar (No 4, wire diameter 0.1 mm) and the sheets subsequently dried for 30 minutes at 60°C in a drying cabinet. The sheets used were a standard adhesion promoted grade of polyester sheeting (Melinex 542 ex ICI).

A silicone premix was then manufactured by mixing together equal parts by weight of a commercially available silicone emulsion and its matching catalyst emulsion (Syl-off 7198 and 7199 respectively, ex Dow Corning). The mixture was stirred for 10 minutes and then allowed to stand at 15 to 20°C for 24 hours.

Meanwhile, a solution of hydroxyethyl cellulose was made by mixing 2.0 parts by weight of a commercially available hydroxyethyl cellulose powder (Natrosol 250HHR-P ex Hercules Powder Limited) with 0.1 part by weight of a commercially available bactericide (Glokill 80 ex ABM Limited) and 97.9 parts of water. After that solution had been formed, it was further diluted with the addition of a small quantity of commercially available surfactant: for each 31.2 parts by weight of the hydroxyethyl cellulose solution already prepared, there was used 0.2 parts by weight of surfactant (Silwet L77 ex Union Carbide) and 68.6 parts of deionised water. Dilution was carried out using a high shear stirrer until the dilute hydroxyethyl cellulose solution appeared homogeneous.

The final coating composition was formed by mixing together, with a high shear stirrer 12.3 parts by weight of the silicone premix which had stood for 24 hours and 87.7 parts by weight of the diluted hydroxyethyl cellulose solution. This produced a silicone coating composition which was coated on to the dried sheets produced as above using a number 10 Meyer bar (wire diameter 0.25 mm) and the so coated sheets were then cured by placing in a drying cabinet at 120°C for 30 minutes. The dried silicone coated sheets were easily handleable and could be used in laser printing apparatus and xerographic copying apparatus.

Xerographic toner images were applied to such sheets using both sorts of apparatus as just noted. Each sheet was then overlain by an identical size sheet of polyethylene terephthalate (Hostaphan RN, 12 microns thick, ex Hoechst) and images were then transferred from the imaged silicone coated sheets to the underside of the polyethylene terephthalate sheets by passing a hand-held heated silicone rubber roller over the assembly. The surface temperature of the silicone rubber roller was around 160°C, a rolling speed of around 5 centimetres per second was used and an applied pressure of around 1 kilogram. On peeling the two sheets apart, the toner image transferred cleanly to the underside of the polyethylene terephthalate sheet.

Since the polyethylene terephthalate sheet is transparent, it may be positioned over artwork, for example, a design done in felt tip pen on heavy paper, and positioned where desired. The image could then be transferred by a further application of the heated roller under the same conditions as before. Under the action of the heat and pressure, the toner image adhered more strongly to the paper than to the polyethylene terephthalate sheet and, on peeling the two

apart, the toner image was left where desired on the paper sheet.

If it was desired to colour the so deposited toner image, this could be achieved by taking a commercially available blocking foil sheet (e.g. an Omnicrom foil sheet) and laying that sheet, coloured side down, over the area where the toner image had been applied and again rolling over with the heated roller under the same conditions as before. On peeling away the Omnicrom or like blocking foil sheet, the coloured layer on that sheet had adhered selectively to the toner image but not to the surrounding paper surface, thus colouring the toner image as desired.

CLAIMS

1. A method of forming artwork having a right reading image thereon which comprises

i) generating upon a first receptor, by a xerographic process, the right reading image in xerographic toner material;

ii) transferring under the application of heat and pressure, the xerographic toner image from the first receptor to an intermediate substrate and removing the first receptor and

iii) assembling together the intermediate substrate and the desired final receptor and, under the action of heat and pressure, transferring the toner image from the intermediate substrate to the final receptor and, thereafter, removing the intermediate substrate to leave the right reading image on the desired final receptor.

2. A method according to Claim 1, wherein after the double transfer of the xerographically deposited image, it is coloured or given a netallic surface effect by the application of a coloured or metallic layer thereon.

3. A method according to Claim 1 or 2, wherein the imageable material is a silicone coated sheet and the intermediate substrate is a polyethylene terephthalate sheet.

4. A method according to Claim 3, wherein the imageable material is a sheet of paper or plastics film having a siliconised surface.

5. A method according to Claim 1 and substantially as hereinbefore described with reference to the foregoing specific example.

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